

WHAT IS CLAIMED IS:

1. A data communication system, comprising:  
a gain control unit for receiving an analog signal converted from a digital  
signal and gain controlling the converted analog signal;  
5 a filter coupled to the gain control unit for filtering the gain controlled  
analog signal; and  
an analog to digital converter coupled to the filter for converting the  
filtered, gain controlled analog signal to a corresponding digital signal.
- 10 2. The system of claim 1 wherein said digital signal and said corresponding  
digital signal output from said analog to digital converter are substantially the  
same.
- 15 3. The system of claim 1 wherein said digital signal is a 64 Kbps pulse code  
modulated (PCM) signal.
4. The system of claim 1 wherein said analog to digital converter includes a  $\mu$ -  
law A/D converter.
- 20 5. The system of claim 1 wherein said gain control unit includes:  
an AC amplifier; and  
a variable gain unit coupled to the AC amplifier, configured to variably  
adjust a signal gain of the converted analog signal.
- 25 6. The system of claim 1 wherein said filter includes a low pass filter.
7. The system of claim 6 wherein said low pass filter includes a second order  
low pass notch filter.

8. The system of claim 6 wherein said low pass filter includes a pole at approximately 4,065 Hz and a zero at approximately 4,216 Hz.

9. The system of claim 8 wherein said low pass filter further includes a  
5 quality factor of 40.9.

10. The system of claim 6 wherein said low pass filter is configured to increase the band edge gain at a frequency of approximately 4 KHz by approximately 6 dB.

11. The system of claim 1 wherein said digital signal received by said gain control unit is provided from a central office switch.

12. An apparatus for providing compensation for signal attenuation in a data  
15 path including a digital-to-analog and analog-to-digital conversion processes, comprising:

a gain control unit for variably controlling the gain of a decoded signal decoded from a digital signal, and for generating a corresponding gain controlled signal; and

20 a filter coupled to said gain control unit for providing equalization to said gain control signal and accordingly, generating an equalized gain control signal for encoding said equalized gain control signal to recover said digital signal.

13. The apparatus of claim 12 wherein the filter is configured to increase the  
25 band edge gain at a frequency of approximately 4 KHz by approximately 6 dB.

14. The apparatus of claim 12 wherein said filter includes a low pass filter having a pole at approximately 4,065 Hz and a zero at approximately 4,216 Hz.

15. The apparatus of claim 12 wherein the gain control unit includes a variable gain control unit having an AC amplifier and a gain unit, said variable gain control unit configured to adjust the gain of the decoded signal by a factor of approximately 1.

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16. A multiple subscriber carrier system supporting v.90 standard data transmission, comprising:

a variable gain control unit coupled to a central office switch for receiving a converted analog signal converted from a digital signal and gain controlling the converted analog signal;

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a low pass filter coupled to the gain control unit for filtering the gain controlled analog signal; and

a  $\mu$ -law analog to digital converter coupled to the filter for converting the filtered, gain controlled analog signal to a corresponding digital signal;

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wherein said low pass filter is configured to increase the band edge gain of said gain controlled analog signal at a frequency of approximately 4 KHz by approximately 6 dB.

17. The system of claim 16 wherein said digital signal and said corresponding digital signal output from said  $\mu$ -law analog to digital converter are substantially the same.

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18. The system of claim 16 wherein said low pass filter includes a second order low pass notch filter.

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19. The system of claim 16 wherein said low pass filter includes a pole at approximately 4,065 Hz and a zero at approximately 4,216 Hz, and a quality factor of 40.9.

20. A data communication system, comprising:

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means for receiving a converted analog signal converted from a digital signal;

means for variably gain controlling the converted analog signal;

means for filtering the gain controlled analog signal; and

5 means for converting the filtered, gain controlled analog signal into a corresponding digital signal.

21. A data communication method, comprising the steps of:

receiving an analog signal converted from a pulse code modulated (PCM) digital signal;

variably gain controlling the converted analog signal;

filtering the gain controlled analog signal; and

10 converting the filtered, gain controlled analog signal into a corresponding digital signal.

15 22. The method of claim 21 wherein said digital signal and said corresponding digital signal output from said analog to digital converter are substantially the same.

20 23. The method of claim 21 wherein said digital signal is a 64 Kbps PCM signal.

24. The method of claim 21 wherein said step of filtering includes the step of providing a low pass filter.

25 25. The method of claim 24 wherein said low pass filter includes a pole at approximately 4,065 Hz, a zero at approximately 4,216 Hz, and a quality factor of 40.9.

26. The method of claim 24 wherein said step of providing said low pass filter includes the step of increasing the band edge gain at a frequency of approximately 4 KHz by approximately 6 dB.

5 27. The method of claim 21 wherein said receiving step includes the step of receiving an encoded signal a pulse code modulated signal from a central office switch.

10 28. A method of providing a multiple subscriber carrier system supporting v.90 standard data transmission, comprising the steps of:  
receiving an analog signal converted from a 64 Kbps pulse code modulated (PCM) signal;  
gain controlling the analog signal;  
filtering the gain controlled analog signal; and  
15 converting the filtered, gain controlled analog signal to a corresponding digital signal;  
wherein said filtering step includes the step of increasing the band edge gain of said gain controlled analog signal at a frequency of approximately 4 KHz by approximately 6 dB.

20 29. The method of claim 28 wherein said step of filtering includes the step of providing a low pass filter having a pole at approximately 4,065 Hz and a zero at approximately 4,216 Hz, and a quality factor of 40.9.

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